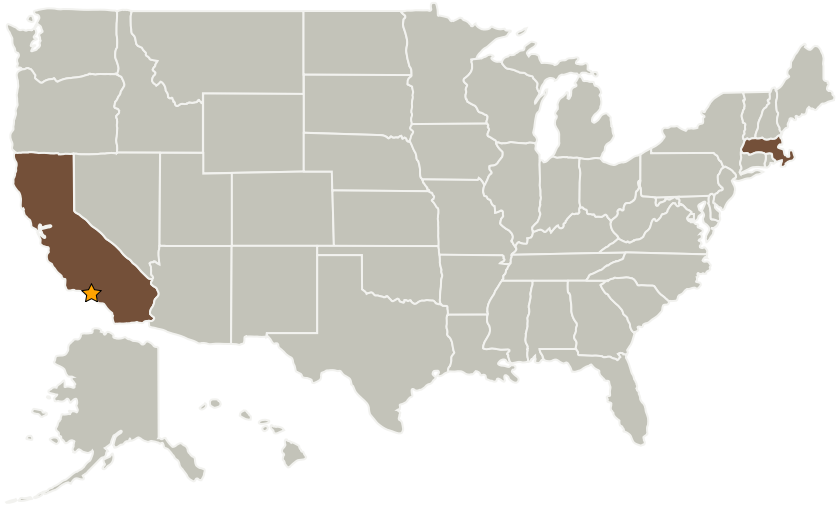
Solid-State Phase-Lockable 1-2THz Local-Oscillator Based on Intra-Cavity Frequency Conversion, Phase I

Completed Technology Project (2006 - 2006)

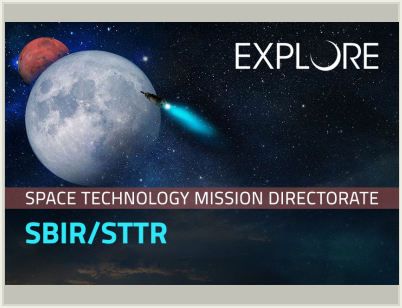
Project Introduction

This proposal provides a breakthrough solution to realize a compact THz local-oscillator, which is phase-lockable and can tune 1-2 THz with flat output power in excess of 100 mW. The innovation is based on high efficiency intra-cavity difference frequency generation. A dual cavity optical parametric oscillator (OPO) is designed to generate two phase-locked optical beams with orthogonal polarizations, which share an EO crystal inside the OPO cavity for THz generation. The frequency difference of the two optical wavelengths can be tuned by changing the phase matching condition of either one of the sub-OPOs. The package size of the local oscillator can be designed smaller than 50x40x20 cm3. The power consumption is <20 W. In Phase I, the feasibility will be demonstrated in a prototype and the system design will be optimized. A fully functional phase-lockable THz local-oscillator with unprecedented performance is anticipated in Phase II.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
AGILTRON Corporation	Supporting Organization	Industry	Woburn, Massachusetts



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Completed Technology Project (2006 - 2006)

Primary U.S. Work Locations	
California	Massachusetts

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.2 Radio Frequency
    - TX05.2.7 Innovative RF Technologies